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ABSTRACT

A project on videodisc technology sponsored by the Illinois State Board of Education has captured classroom teachers teaching in their own classrooms to their own students. By digitizing this video instruction onto videodiscs preservice teachers and instructors have a visual learning tool that provides instant access to a variety of pedagogical information. Six outstanding teachers were videotaped on two separate occasions teaching hands-on science to their elementary school students. The process began with the identification of these teachers, who then prepared lesson plans prior to the videotaping. Each member of the production staff explained his or her function and the equipment to the children before the taping to reduce their tendencies to focus on the crew rather than the teacher. Videodiscs incorporated the following topics: (1) process skills at a basic level, (2) process skills at a more advanced level, (3) science teaching methods, (4) interdisciplinary science, (5) classroom management, and (6) questioning strategies. Discs will be used in teacher education at Northwestern Illinois University to illustrate pedagogical concepts to classes and for individual study. (Contains 9 references.) (SLD)

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Visualizing Classroom Instruction: Creating Visual Images for Preservice Teacher Education

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Visualizing Classroom Instruction: Creating Visual Images for Preservice Teacher Education

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Infusing technology in teacher education is critical for developing teachers for the 21st century (Sununu, 1986; NSTA, 1990). Studies show if teachers are to use technology they must be provided with opportunities to experience technology as learners and users (Baird, 1991; Brooks, & Kopp, 1989; Smylie, 1989). Currently, efforts are underway at Northern Illinois University to produce a series of videodiscs for use in the undergraduate elementary teacher education program. These discs will serve two purposes: 1) for instructors to provide visual images of exemplary science teaching in their elementary science methods course, and 2) for undergraduates to use as a Level III visual library of selected science education topics commonly found in teacher education programs.

Teacher educators continue to explore ways of effectively presenting preservice teachers with exemplary examples of instruction. A wide body of research demonstrates that visual images are powerful teachers for students in education. Videodisc technology is replacing videotape as the most desirable method for motion presentations (Utz, 1991; Fritz, 1991). Videodisc technology has several application levels ranging from direct access to computer controlled instruction (Angelo, 1992; Litchfield, & Dempsey, 1992). This technology is ideal for instruction due to immediacy of access, multiple audio tracks, and mix of media that can be impressed on the disc. This project, sponsored by the Illinois State Board of Education, has captured classroom teachers teaching in their own classrooms to their own students. By digitizing this video instruction onto videodiscs the preservice teachers and instructors are provided a visual learning tool that has instant access to a variety of pedagogical information.

This project was designed to facilitate instruction in elementary school science education. Current trends in education call for providing meaningful instruction. In science education this means hands-on activities that allow students to construct their own meanings. This series of videodiscs is an opportunity to bridge theory into practice. It provided

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an opportunity to capture positive role models implementing outstanding pedagogic practice.

This paper will discuss the process that was undertaken to create the digitized images for the instruction of preservice teachers about science education.

Project Overview

Six outstanding teachers were videotaped on two separate occasions in their own classrooms teaching hands-on science to their own students. The lessons were designed by the classroom teachers and were an integral part of their normal science programs. The project resulted in the completion of six videodiscs entitled: ***Elementary School Science Instruction: Capturing Excellence.***

Each videodisc contains a twenty minute science lesson, and a reservoir of thirty second episodes that relate to the topic. The disc titles include: Process Skills I, Process Skills II, Interdisciplinary Science, Methods of Instruction, Classroom Management, and Questioning. Each disc contains four audio tracks: 1) the lesson as it happened, 2) the teachers' comments, 3) the students' comments, and 4) a science educator's comments.

Phase I - Teacher Identification

In the initial phase of the project exemplary teachers were identified. This process was achieved at the Illinois Science Teachers Association Conference in the fall of 1992. Potential teachers were identified by evaluating the list of nominees for the outstanding science teacher award and by peer recommendation. An attempt was made to select teachers from inner city and suburban schools, from a variety of grade levels, and representations of both genders. The final selection of teachers included two males: one suburban fifth grade and one inner city seventh grade; and, four females: one inner city second grade, one suburban fourth grade, and two suburban fifth grade.

After the six teachers were recruited they met at the university where they received inservice training with regard to the project. Philosophy of the project, science methodology, process skill acquisition, questioning strategies, and videotaping details were discussed. Lesson plans were made and submitted to the project director before videotaping began.

Phase II - Videotape Production

Prior to the first videotaping, the producer visited each classroom to identify any special technical concerns inherent in each classroom. Special attention was given to reduce those variables which might pose technical problems with on-site videotaping. These variables included such things as lighting needs, school intercoms, electrical outlets, heating fans, wall color, and ease of moving equipment during times when children were not in the halls.

During this phase each teacher was videotaped on location teaching a hands-on science lesson to his/her whole classroom. To reduce the children's inclination to act silly or to look at the camera, each member of the production staff explained his/her function, the equipment used, and the nature of their work at the university. This reduced the children's tendencies to focus on the crew rather than the classroom teacher. For the most part children were very cooperative and indeed focused their attention on the science activity rather than the confusion associated with videotape production.

A single betacam was used for videotaping. The teachers wore a wireless microphone and a shotgun microphone was used to record the children's comments. At the end of some of the science lessons, head shots of students were taken for editing purposes. Also, close-ups were made of teacher demonstrations and of students using small equipment that was difficult to see from long range. Each videotaping session lasted about two hours.

A rough edit of the half-inch videotape was created. Upon completion the videotape was taken back to the school for the children to view. Their comments regarding what they remembered taking place were recorded. A videotape player and monitor was placed in the front of the classroom. A betacam was focused on the television monitor in order to correlate the children's comments with the corresponding rough edit segment. After showing a brief segment, the tape was paused and the children were asked to reflect on what they saw. Often, the teacher or the project director asked them questions to trigger a response. The children were then instructed to state the question as an introductory phrase in their response. This enabled the viewer to understand the nature of the children's response.

Each teacher was invited to return to the university to view the same rough edit in the recording studio. Again, a betacam was focused on the television monitor in order to correlate the teacher's comments with the corresponding rough edit segment. The teachers were shown a brief segment and then asked to record their comments within a specified time frame. The science educator's comments were recorded in a similar manner.

Phase III - Final Editing and Laserdisc Pressing

Final editing was performed on two blank three-quarter inch parallel masters with identical timecodes. Tape one was used to record the final video portion along with the original sound track and the teacher's comments. To avoid problems during duplication, tape two contained the science educator's and the children's comments correlating to tape one's time code no video was place on tape two.

Each set of parallel tapes was subsequently transferred to the D-2 videotape format that contained all four sound tracks. The D-2 master videotape was sent to 3-M for videodisc pressing.

The final CAV videodisc contained chapters for each instructional segment and included built in stops. The stops were used to separate the thirty second episodes contained in the reservoir. They were installed to force the Level I viewers to stop at the end of each short segment before preceding to the next segment, thus attempting to promote reflection on the segment just viewed.

Final Products

Six videodiscs were completed using segments from both of the lessons conducted by each of the six exemplary teachers. Each disc was organized around a twenty minute model lesson from start to finish, followed by a reservoir of eight to fourteen, thirty second vignettes relating to the same theme. The following are the six topics chosen because of their likely inclusion in most elementary

science education methods course syllabi:

Process Skills I -The basic skills of science such as observing, measuring, classifying, communicating, and predicting were highlighted. The featured fourth grade lesson focused on the topic of seashells. A reservoir of additional examples completed the disc.

Process Skills II - This disc covered integrated or more advanced skills like hypothesizing, inferring, recording and interpreting data. The featured fifth grade lesson focused on a study of dew point. A reservoir of additional examples completed the disc.

Methods of Teaching Science - Commonly used methods of discussion, guided discovery, and open inquiry were accented. The featured fifth grade lesson focused on the nature of matter. A reservoir of additional examples completed the disc.

Interdisciplinary Science -This disc examined ways to incorporate other content areas into a science lesson. Fourth graders were introduced to sensory awareness under the umbrella theme of National Parks. A reservoir of additional examples completed the disc.

Classroom Management -Creative techniques to maintain class control during hands-on science activities were emphasize. The featured second grade lesson focused on an activity where children identified common objects as either conductors or nonconductors. A reservoir of additional examples completed the disc.

Questioning - Questioning strategies were the focus of this disc. Methods of questioning were highlighted in this fifth grade science lesson. Students were involved in the dissection of light bulbs as a part of their study about electricity. A reservoir of additional examples completed the disc.

Looking to the Future

The videodiscs were originally intended for use in the preservice teacher education program at Northern Illinois University. However, before production began, the Illinois State Board of Education decided to distribute copies of each disc to other Illinois institutions involved in preservice teacher education. Furthermore, Educational Service Centers (ESC) were targeted to receive copies for use in inservice or staff development activities. In all, twenty-five copies of each title will be available to educators in the state of Illinois beginning in the spring of 1994.

Science methods instructors at Northern Illinois University will use the discs in two different ways. During lectures and discussions they will be used to illustrate pedagogical concepts with classroom scenes involving real hands-on science lessons. In addition, preservice teachers will be able to view the videodiscs on their own to review information presented in class or to expand their knowledge. For the first time in teacher preparation, preservice teachers will be able to view the same lesson through the eyes of a child, the teacher, a science educator, or their own, as it actually happened. Only with videodisc technology will the viewer be able to quickly

switch between one of four audio tracks with a simple command.

The set of eight videodiscs under the title, ***Elementary School Science Instruction: Capturing Excellence*** will enable science educators to demonstrate examples of outstanding science instruction. With a large data base of visual images at the fingertips of an instructor, preservice students will have the opportunity to see positive role models engaging children in quality science lessons and hear four different perspectives with relative ease.

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